

Field identification of the Javan Hawk Eagle *Spizaetus bartelsi*

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The Javan Hawk Eagle *Spizaetus bartelsi* is one of the world's least known raptors. A detailed description of the different plumages of the species is presented. Features useful for the identification are discussed, and its appearance in flight is shown. Sonagrams are presented.

INTRODUCTION

The Javan Hawk Eagle *Spizaetus bartelsi* is endemic to the island of Java (Indonesia) and is confined to the lowland and hill rain forests and the montane ever-wet rain forests. It has been recorded up to 3,000 m in the western part of the island, but can also be found at sea level. Until recently it was thought that the species only occurred on the westernmost and easternmost parts of the island (e.g. Thiollay and Meyburg 1988), but research conducted by the authors in the central part of Java documented its presence throughout the island in the best preserved forest areas (Sözer and Nijman 1995b). The most recent estimates (S. van Balen, V. Nijman, unpubl. data), based on extrapolation using average territory size and total area of suitable habitat, reveal that c. 142-204 breeding pairs (or c. 600-1,000 individual birds, including immatures) remain. This low number, the continuing habitat destruction, as well as the trade in the species, justify its inclusion as Endangered in *Birds to watch 2* (Collar *et al.* 1994).

The field identification of the Javan Hawk Eagle has always been notoriously difficult due to a lack of adequate descriptions of its plumages in the different stages of its life before it reaches maturity. Although Bartels (1924) had already drawn attention to the various immature plumages, his descriptions remain unpublished. Descriptions of the species in standard works on raptors (e.g. Brown and Amadon 1968, Weick and Brown 1980, Burton 1989) have been inadequate, as most of the illustrations have shown juveniles or immatures. More than adults, immatures tend to wander and are occasionally seen outside the tall forests; hence they are more easily observed. Even if an 'adult' has been depicted, it has at best been an immature showing some adult features, but still lacking the most important characters for field identification (e.g. Hoogerwerf 1949, MacKinnon 1990). The inaccuracies in the literature are based on historical misidentifications (e.g. Kuroda [1936], depicts a Rufous-bellied Eagle *Hieraetus kienerii*) and the fact that most of the illustrations are based on older depictions and museum skins. In addition, the few flight images in the literature are rather poor, uncharacteristic and, once again, mainly based on immature birds.

As part of a larger study, a detailed description of the species was made (Sözer and Nijman 1995a). A summary is presented of the various plumages of the bird, its appearance in flight and distinguishing features from other similar raptors. Additional information was gathered by examining museum specimens in the

National Museum of Natural History, Leiden, the Netherlands and the Museum Zoologi Bogor, Indonesia. Furthermore, we made observations on captive birds in Taman Safari, Cisarua and Taman Mini Indonesia Indah, Jakarta. Different aspects of the identification were discussed with other ornithologists who were familiar with the species.

APPEARANCE IN FLIGHT

Tropical forest raptors are difficult to see in the forest, so Javan Hawk Eagles can best be seen during periods of strong thermal activity, from vantage points outside or above the forest, or from viewpoints over the canopy on hillsides. When soaring, the wings are held in a slight V-shape and without flapping, so the bird can be observed at length, providing the best opportunity for seeing the pattern of banding on the underwing. When in active flight the wing-beats are regular and rather fast. During gliding the wings may be held slightly swept back. Flying adults show a distinctive wing pattern when seen from below (Figs. 1c-d). From above the bird is much darker, but even then the pattern of banding can be seen. This pattern on the underwings and on the underparts is usually visible, given a clear view under good light conditions. The longish head and tail impart a rather slender appearance. The tail is held straight or is occasionally spread out, and in both positions the banding pattern can be seen clearly. Immatures show less pronounced banding (Fig. 1b), and in juveniles the banding pattern on both wings and tail is incomplete; the wings appear white with grey-buff primaries and cinnamon-brown underwing-coverts, whilst the white patch in between is triangular, with the tip at the carpal joint (Fig. 1a).

One of the most characteristic features of the adult is the chestnut-coloured head with a black crown and yellow-brown nape (appearing golden in sunshine), which always contrast with the much darker body and wings. The crest is seldom seen on a flying bird.

Flying immatures appear cinnamon-brown from below with a similar, but less pronounced, wing pattern. The flight pattern of the juvenile as depicted in MacKinnon and Phillipps (1993) shows a white plumage, an error that might have originated from Kuroda's confusion of the white juvenile Rufous-bellied Eagle with Javan Hawk Eagle (cf. van Balen 1993). From above the immatures are paler and more mottled than the adults. The wingspan of juveniles seems slightly smaller, while the tail seems longer than those of adults.

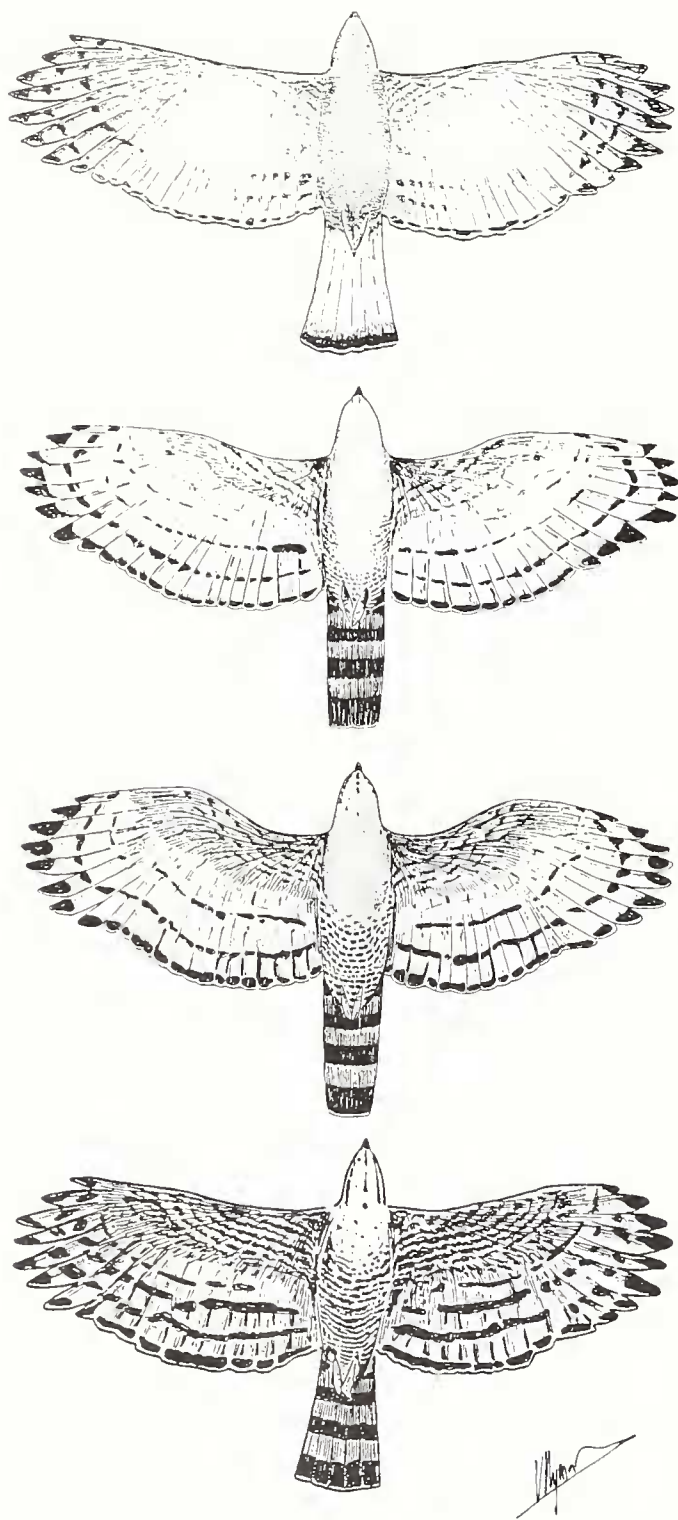


Fig. 1 Javan Hawk Eagles *Spizaetus bartelsi* from below: a) juvenile; the underparts and the underwing coverts are cinnamon-brown, and the underside of the primaries and tail are grey-buff. b) immature in 2nd or 3rd year plumage; banding present on the underside of the tail, the bands on the underwing are very pronounced, and some bars are apparent on the belly and flanks. c) Immature in 3rd to 5th year plumage; the bars are fully developed, and the moustachial and mesial stripes have started to appear. d) Adult, probably from 5th or 6th year or older; base colour of breast has changed to white, and the moustachial and mesial stripes are well developed. (V. Nijman).

SIMILAR SPECIES

The overall appearance of Changeable Hawk Eagle *Spizaetus cirrhatus* is that of a more robust bird with a relatively shorter neck and tail. Juveniles are white rather than cinnamon. Of the two morphs, only the pale morph can cause confusion, as the black one is easily excluded by its colour. The adult Changeable Hawk Eagle of the

pale morph is streaked instead of barred. The Black Eagle *Ictinaetus malayensis* is easily recognised by its larger wingspan (especially compared to its tail) and more obvious fingering; immatures can be quite pale brown and, when seen briefly, may cause confusion, but they remain much darker and lack wing-bars. Compared to the Javan Hawk Eagle its flight is less stable, almost unbalanced, resembling kites; typically when soaring the tips of the wings are held upward. The Crested Serpent Eagle *Spilornis cheela* is smaller, and while soaring holds its wings forward; the wings are held in a characteristic shallow V-shape in a flat plane with the head; in adults the white band on the underwing is clearly visible. The Rufous-bellied Eagle is smaller than the Javan Hawk Eagle and shows no barring; due to its large crest this eagle can resemble a Javan Hawk Eagle, especially when perched or when seen in silhouette only.

Recently a hitherto undescribed plumage phase of the Oriental Honey-buzzard *Pernis ptilorhyncus ptilorhyncus* was found in the southern region of West Java (van Balen *et al.* in prep.). This form (possibly an immature) lacks the barring on its underparts and shows similarities with immature Javan Hawk Eagle, similar as described for the Sulawesi Hawk Eagle *Spizaetus lanceolatus* and the Barred Honey-buzzard *Pernis celebensis* (e.g. Meyer and Wigglesworth 1898, Watling 1983). Although Oriental Honey-buzzards are much smaller and more slender than Javan Hawk Eagles, and their mode of flight (very deep wing beats) is quite different as well, the possible similarity in their plumage has to be taken into account when identifying these species.



Fig. 2 a) and b) Javan Hawk Eagle, female soaring, August 1994, Mt. Slamet, central Java (photos: V. Nijman)

APPEARANCE AT REST

Javan Hawk Eagles can sometimes be seen perching in large trees inside, or even at the edge of, the forest. They occasionally perch in smaller trees near the ground. When perched they often raise their crest.

Adult

A medium to large, slender eagle with a total length of c. 60-70 cm. Sexual dimorphism is reversed and appears moderate (Nijman and Sözer, 1996); despite the female being larger and more robust than the male, the overall appearance remains slender. The head is chestnut-brown and the nape is yellow-brown. The crown has dark brown or even black feathers with thin buff margins and the area round the eye appears very dark with pronounced eyebrows. The iris is bright yellow and the bill is dark grey to black with a grey cere. The crest consists of two to four long (up to 12 cm), black feathers with white tips, and it may be fan-shaped or pointed (van Balen *et al.* 1994). The throat can be almost pure white, bordered by dark brown to black moustachial stripes and with a dark brown mesial stripe. The back and upperwings are dark brown with buff margins to the feathers; the tips of the primaries are black. The upperside of the tail is dark brown with four black bands and a thin white terminal band. The underside of the tail is greyish-buff with four brown bands and a white margin. The underparts are whitish-buff to white; the breast is marked with bold, dark brown drop-shaped marks, and the belly is narrowly barred dark brown. The talons are quite long with feathers covering the base of the feet.

The legs are whitish with narrow dark brown bars; the feet are yellow and the claws black.

Juvenile and immature

The juvenile has a cinnamon-brown head and crown, lacking the contrasting moustachial and mesial stripes; the iris is bluish-grey (the dark brown iris, as reported by van Balen *et al.* [1994], is present only in downy chicks); the crest is black with white tips; the upperparts are not as dark brown as in the adult and the underparts are cinnamon-brown; the underside of the tail is greyish-buff with only the outer dark brown band evident. In second-year birds the iris gradually turns yellow, the crown becomes darker and the bands on the tail become apparent. In subsequent years the bars on the underparts develop gradually, appearing first near the flanks and legs. The moustachial and mesial stripes usually appear at this stage, although in some individuals the latter may not develop at all. When the bars and bands are fully developed the breast turns lighter until it can be almost pure white, and the drop-shaped marks appear. The fully mature plumage is probably reached in five to six years.

VOCALIZATIONS

Identification by call is essential in rainforest where birds are very difficult to see and may not provide adequate views for positive identification. At least some of the calls of the Javan Hawk Eagle are diagnostic. During courtship they are very vocal and can be heard from afar.

Call-type I

A single or repeated disyllabic call *ee-eeew* or *eeew-eee*. These calls, produced by both male and female, were the ones most often recorded, and could be heard from a great distance; they are also uttered by perched juveniles. The call (duration c. 0.9-1.2 sec.) consists of two syllables and has a rather high-pitched tone. The first syllable is 0.2-0.4 sec. long and has a frequency of 3.8-4.1 kHz; the second syllable is 0.6-0.8 sec. long, the beginning shows a frequency modulation between 3.8-5.4 kHz and the last part has a frequency between 3.7-4.1 kHz (Fig. 2b). Occasionally this call consists of three syllables: *ee-ee-eeew* or even only one: *eeew*. We also heard this same call but with a harsher beginning: *klee-eeew* *klee-eeew*. The interval between two calls was 1.3-1.6 sec.

Call-type II

This consists of a rapidly repeated, high-pitched sound at short intervals: *klü-klü-klü-klü-klü*, with a spacing of 0.4 sec. We heard this type of call on only two occasions, but it was also noted by H. Bartels (pers. comm., 1995); it is similar to the second call described by van Balen *et al.* (1994).

Call-type III

This consists of a single loud *glee-eck*. This is probably the same call as the *keeEE(k)* described by van Balen (1991) and *seeEEE(k)* (van Balen *et al.* 1994). It is often heard when birds take off or when under attack, and is probably used as an alarm call, when excited or during take-off.

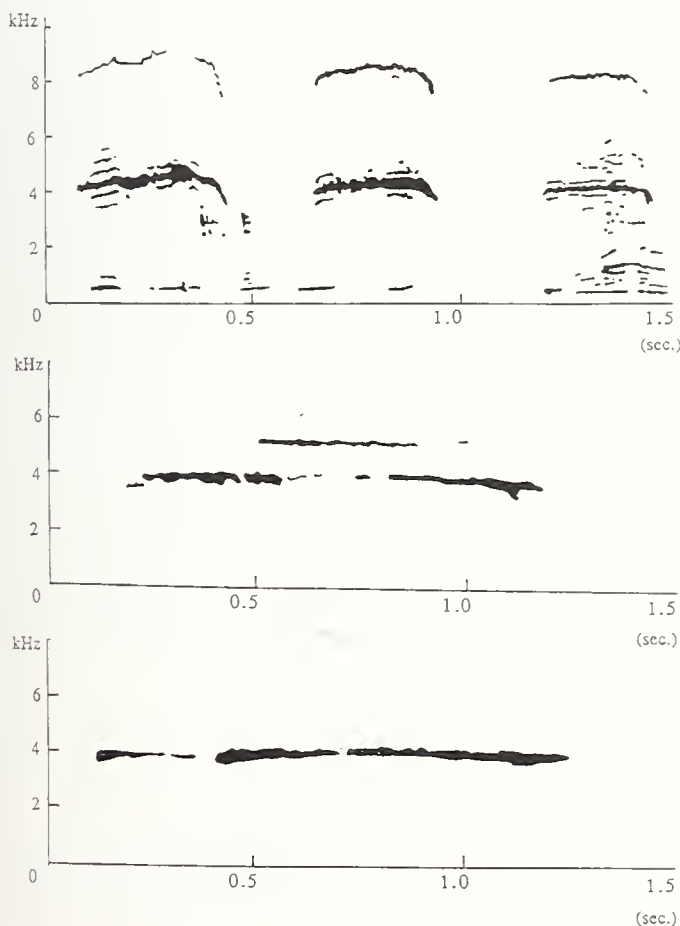


Figure 3. Sonagrams of a) Javan Hawk Eagle chick, b) adult Javan Hawk Eagle, c) adult Changeable Hawk Eagle

Call-type IV

A soft screaming call of a chick, heard for the first time at the age of six weeks, when the female was present at the nest. What was probably the same call was heard from a 9-week-old chick in the Taman Safari Zoo, and tape recordings were made (Fig. 2a). This begging call consisted of fast repeated notes with a duration of 0.2-0.4 sec., and with intervals of 0.2-0.3 sec. The notes show a frequency modulation of 3.8-9.0 kHz.

Calls of other species

The typical call of Changeable Hawk Eagle (Fig. 2c) sounds like *klee klee klee klee*, which resembles call-type I of the Javan Hawk Eagle but is lower in tone (frequency of 3.7-4.1 kHz), shorter in duration and abruptly terminated, whilst that of the Javan Hawk Eagle fades slowly. The alarm call of Changeable Hawk Eagle is described as *kleee-leek*. The call of the Black Eagle is lower in tone and consists of *kee* repeated several times. The Crested Serpent Eagle is the most frequently heard raptor in the Javan forests; its call consists of a shrill cry: *kwee-kwee-kwee, kwee-kwee*, in a faster tempo than that of the Javan Hawk Eagle.

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